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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/727,201	12/03/2003	Joon Mo Kang	IME02-021	5145

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STEPHEN B. ACKERMAN  
28 DAVIS AVENUE  
POUGHKEEPSIE, NY 12603

EXAMINER
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KIANNI, KAVEH C

ART UNIT	PAPER NUMBER
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2883

DATE MAILED: 10/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/727,201

Applicant(s)

MO KANG ET AL.

Examiner

Kianni C. Kaveh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-57 is/are pending in the application.
- 4a) Of the above claim(s) 17-57 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

Applicant's election with traverse of Group A (claims 1-16; as indicated in page 5, 2<sup>nd</sup> parag.) in response submitted on 8/17/05 is acknowledged. The traversal is on the ground(s) that search and the examination of the entire application can be made without serious burden since process claims necessarily use the product and vice versa. Though the applicant concedes that the process claims directed to forming "a method of forming a substantially planar surface of an optical waveguide device", and that the product claims are directed to "a low loss waveguide device" the applicant indicates that "it is necessary to obtain claims in both the process and product claim language" (see page 3, 1<sup>st</sup> parag.). The examiner responds that as indicated in the specification as well as election of species there are several embodiments—several/different processes for forming a substantially planar surface of an optical waveguide device as stated in different claims/embodiments and thus each of such embodiments/inventions *including different limitations—as clearly indicated in the restriction requirement, method vs. product claims, as well as different election of species, different process claims. While the product claims do not need to be made using different processes as claimed and it can be made, as indicated by the examiner, by different process(s). Thus, each of such different inventions requires a different search than that requires for other invention and thus the restriction requirement and/or election of species are still deemed proper and is* therefore made FINAL.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 2-16 depend on claim 1 and therefore they are also rejected.

Claims 1 recites the limitations "the higher cladding exposed portion", lines 12 and 14; "the remnant", line 14; "the smooth upper surface" in lines 18-19. There are insufficient antecedent basis for these limitations in the claim. Corrections are required.

Claim 1 is ambiguous, since in lines 17-20 the limitation "to a predetermined thickness over the upper surface of the waveguide core portion..." is vague as indefinite and incomplete sentence/limitation as what or which portion of the optical waveguide device planarized to a predetermined thickness..., and what is coplanar with the upper surface of the waveguide core. Corrections are required

Claim 12 recites the limitation "the patterned sacrificial portion protruding remnant". There are insufficient antecedent basis for these limitations in the claim.

### **Allowable Subject Matter**

Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if its base claim no longer is rejected under USC 12 Second paragraph and rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 5 is allowable because the prior art of record, taken alone or in combination, fails to disclose or render obvious wherein the waveguide core portion

comprises at least one waveguide core embedding within at least another waveguide core in combination with the rest of the limitations of the base claim.

### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4 and 6-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davids et al. (US 20030161571).

Regarding claim 1, Davids teaches a method of forming a substantially planar surface of an optical waveguide device (shown in at least fig. 7-11 and see abstract), comprising the steps:  
forming at least one waveguide core portion 32 within at least one cladding portion 24,50 (shown in at least fig. 10 and 7, item 32);

the waveguide core portion 32 having an upper surface (shown in at least fig. 7B and 10A, item upper surface of core 32);

the cladding portion having a higher portion 50 over at least the waveguide core portion 32 and a lower portion 24; forming a patterned sacrificial portion over the lower cladding portion 14 (see parag. 0015) and a portion of the higher cladding portion 50 (see parag. 0025), leaving a second portion of the higher cladding portion exposed (see fig. 9-10, item 50 and parag. 0025);

removing at least a portion of the higher cladding exposed portion by a selective removal process selective to the patterned sacrificial portion leaving a remnant of the higher cladding exposed portion (see parag. 0025);

planarizing:

the remnant of the higher cladding exposed portion over the waveguide core portion (shown in at least fig. 10A and see parag. 0024);

and the lower cladding portion (see parag. 0014);

to a thickness over the upper surface of the waveguide core portion 32 and the upper surface of the cladding portion 50 coplanar with the smooth upper surface of the waveguide core portion 32; to form the substantially planar surface of an optical waveguide device (shown in at least fig. 10, item planar waveguide device with the smooth upper surface of the waveguide core portion 32).

However, Davids does not explicitly state that the above thickness is a predetermined thickness. Nevertheless, Davids states that each of the components of the above planar waveguide has certain thickness (see parag. 0021-0024). Thus, it is

obvious/well-known to those ordinary skill in the art when the invention was made that a certain thickness components of an optical device is/known-to-be a predetermined thickness, since such planar waveguide would provide an integrated waveguide device with high speed, low loss and high gain characteristics (see parag. 0004).

Regarding claims 3-4 and 6-16, Davids further teaches wherein the predetermined thickness is between about 0 and 200 nm (see at least parag. 0012); wherein the cladding portion has a first index of refraction, the waveguide core portion has a second index of refraction; and the waveguide core portion second index of refraction is greater than the cladding portion first index of refraction (see at least parag. 0002 and 0010); wherein the planarization is a chemical mechanical polishing process (see parag. 0014); wherein the patterned sacrificial portion is comprised of: photoresist; or photoresist stacked upon a film comprised of: silicon nitride, silicon oxynitride organic silicate glass, diamond like carbon, silicon dioxide, polyimide, PMMA, tantalum, tungsten or molybdenum (see at least paarg. 0015 and 0019 see at least photoresist); wherein the cladding portion is comprised of silicon nitride, organic silicate glass, silicon dioxide, polyimide or PMMA (see at least parag. 0014); wherein the selective removal process selective to the patterned sacrificial portion is a dry and/or wet etching process (see parag. 0013); wherein the patterned sacrificial portion is removed before the planarization (see at least parag. 0015); wherein the sacrificial portion is photoresist and the patterned sacrificial photoresist portion is removed before the planarization by a stripping process (see at least parag. 0015); wherein the

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waveguide core portion is formed using a first mask (see at least parag. 0019); and the patterned sacrificial portion is patterned from a sacrificial layer using a second mask that is the reverse of the first mask (see at least parag. 0030); wherein the planarization also removes the patterned sacrificial portion protruding remnant (shown in at least fig. 8c and 9A, item removing the patterned sacrificial portion protruding remnant to form at least 18 and core 32); wherein waveguide core portion is formed using a first mask (see at least parag. 0019); and not all the sacrificial portion area is needed to be patterned using a second mask that is the reverse of the first mask (see at least parag. 0019 and 30; note also that no patentable weight can be given to a/this negatively cited limitation); wherein the patterned sacrificial portion is also removed during the planarization (see at least parag. 0019); wherein the planarization includes a fine planarization process (see at least parag. 0014 and 0024, wherein fine planarization is implemented through chemical processing analogous to that of the claimed invention--in the specification); wherein the planarization of the remnant of the higher cladding exposed portion over the waveguide core portion and the lower cladding portion does not expose the upper surface of the waveguide core portion (see at least parag. 0014 and 0024; note also that no patentable weight can be given to a/this negatively cited limitation).



***Citation of Relevant Prior Art***

Prior art made of record and not relied upon is considered pertinent to applicant's disclosure. In accordance with MPEP 707.05 the following references are pertinent in rejection of this application since they provide substantially the same information disclosure as this patent does. These references are:

Lee et al. 20030215189

Hasse et al. 20030007535

Glebov et al. 6922508

Zhang et al. 6946238

These references are cited herein to show the relevance of the apparatus/methods taught within these references as prior art.

***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kianni C. Kaveh whose telephone number is 571-272-2417. The examiner can normally be reached on 9:30-19:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**KAVEH KIANNI  
PRIMARY EXAMINER**

K. Cyrus Kianni  
Primary Patent Examiner  
Group Art Unit 2883

October 26, 2005

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